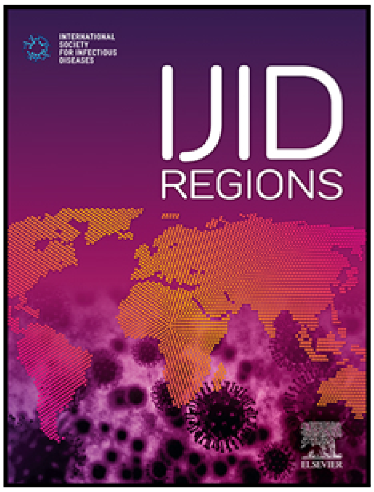

Clinical characteristics of patients With Asymptomatic and Symptomatic COVID-19 Admitted in a Tertiary Referral Center in the Philippines

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PII: S2772-7076(22)00018-2
DOI: https://doi.org/10.1016/j.ijregi.2022.02.002
Reference: IJREGI 67

To appear in: *IJID Regions*

Received date: 10 August 2021
Revised date: 25 January 2022
Accepted date: 4 February 2022

Please cite this article as: Anna Flor G. Malundo , Cybele Lara R. Abad , Maria Sonia S. Salamat , Joanne Carmela M. Sandejas , Jose Eladio G. Planta , Jonnel B. Poblete , Shayne Julieane L. Morales , Ron Rafael W. Gabunada , Agnes Lorrainne M. Evasan , Johanna Patricia A. Cañal , Julian A. Santos , Jeffrey T. Manto , Raniv D. Rojo , Eric David B. Ornos , Mary Elise L. Severino , Maria Elizabeth P. Mercado , Marissa M. Alejandria , Clinical characteristics of patients With Asymptomatic and Symptomatic COVID-19 Admitted in a Tertiary Referral Center in the Philippines, *IJID Regions* (2022), doi: https://doi.org/10.1016/j.ijregi.2022.02.002

Highlights

- Asymptomatic infection is common
- Bimodal age distribution of COVID-19 infection observed in UP-PGH
- Universal testing impacts infection control measures in resource-limited setting
- Further blood testing is likely unnecessary for mild and asymptomatic COVID-19
- Symptom-based isolation protocol shortens hospitalization

Clinical characteristics of patients With Asymptomatic and Symptomatic COVID-19 Admitted in a Tertiary Referral Center in the Philippines

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Clinical characteristics of patients With Asymptomatic and Symptomatic COVID-19 Admitted in a Tertiary Referral Center in the Philippines

ABSTRACT

Objectives: We aimed to describe the clinical profile and outcomes of hospitalized patients with COVID-19 across the spectrum of disease activity.

Methods: This was a retrospective study of adult patients with confirmed COVID-19 infection admitted in a referral hospital. Descriptive statistics, tests for trend, Kaplan-Meier curve and log-rank test were used to compare characteristics and outcomes across disease activity.

Results: Of 1500 patients, 14.8% had asymptomatic, while 85.2% had mild (13.5%), moderate (36.6%), severe (12.3%), and critical (22.7%) COVID-19. Asymptomatics were admitted for concurrent condition or for isolation. Age >60 years, male gender, and patients with comorbidities had more severe disease. Fever, cough, shortness of breath, malaise, gastro-intestinal symptoms, and decreased sensorium were more frequent with severe disease. Bilateral pulmonary infiltrates were common (51.1%), with sicker patients having more abnormal findings. Overall mortality rate was 15.1%. Adopting a symptom-based strategy shortened hospitalization from a median of 13 days (IQR 7,21) to 9 days (IQR 5,14).

Conclusion: The clinical profile and outcomes of our COVID-19 cohort is consistent with published reports. Asymptomatic infection is common, and universal testing may be a valuable strategy in the right context, given infection control implications. Symptom-based strategy considerably shortens the duration of hospitalization.

Key words: COVID-19, Philippines, epidemiology, asymptomatic, severity

Word count: 198 words

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and has resulted in a pandemic infecting more than 273 million people worldwide (World Health Organization, 2021a). With the pandemic in its second year, much have been uncovered to understand virus' pathogenesis, transmission, and risk factors for disease progression and mortality (World Health Organization, 2021b). Governments and hospitals have adapted to structural and resource limitations with changes in policies. But despite all these, the Philippines remains to be the most affected in the Western Pacific Region reporting the highest cumulative number of COVID-19 cases and deaths as of December 22, 2021 (World Health Organization, 2021c).

Most published data on COVID-19 were from Western- and high-income countries. The largest published data from the Philippines was from a multicenter study that included 10,881 patients which focused on neurologic manifestations among COVID-19 patients(Espiritu et al., 2021). On the other hand, 500 patients were included in a study from an infectious disease referral hospital in Metro Manila which compared the clinical profile and outcomes among healthcare workers (HCWs) and non-HCWs(Agrupis et al., 2021). The rest of available data from the Philippines described early experience, were from a small number of patients, and excluded asymptomatic individuals (Abad et al., 2021; Edrada et al., 2020; Salamat et al., 2021; Soria et al., 2021). Asymptomatic infection accounts for approximately 25% of COVID-19 cases (Alene et al., 2021). This population has the potential to drive community transmission and strain health-care resources. In the University of the Philippines – Philippine General Hospital (UP-PGH), asymptomatic infections were often identified through universal testing, i.e. SARS-CoV-2 testing regardless of indication for admission or presence of symptoms. Due to the uncertainties early in the pandemic, mild and asymptomatic patients were sometimes admitted for monitoring. Aside from the excessive admissions, hospital capacity was also strained by the implementation of the test-based strategy which required two consecutive negative SARS-CoV-2 test results before discontinuation of transmission-based precautions and discharge of recovered patients. This policy was later updated in July 2021 and specific groups of patients can then be discharged for as long as significant clinical recovery was noted without requiring antipyretics within the last 3 days of a 14-day isolation period (i.e. symptom-based strategy)(Philippine Society for Microbiology and Infectious Diseases et al., 2020).

Our study aimed to describe the clinical characteristics and outcomes of the first 1,500 adult inpatients with confirmed COVID-19 in UP-PGH, in view of prioritizing healthcare resources. The clinical predictors of mortality and disease progression were analyzed in a separate paper.

METHODS

Study Design and Setting

We reviewed the medical records of adult inpatients with confirmed COVID-19 infection in UP-PGH, a tertiary-level COVID-19 referral hospital in Metro Manila, the epicenter of the COVID-19 pandemic in the Philippines. The UP-Manila Ethics Review Board approved this study including waiver of patient informed consent.

Study Sample

We used the UP-PGH Registry of Admissions and Discharges to identify patients aged 19 years and above with confirmed COVID-19 infection. Because of limited clinical information, we excluded patients who died or were discharged within 24 hours of admission, transferred to another hospital, and those with medical records unavailable for review during the time of analysis. We characterized 1,500 consecutive inpatients from March 12, 2020 to September 9, 2020 with confirmed COVID-19 infection. Figure 1 shows the cohort selection process.

Definitions

A *confirmed* COVID-19 case was any patient with a positive reverse transcription polymerase chain reaction (RT-PCR) test for SARS-CoV-2 conducted at a testing facility accredited by the Department of Health. RT-PCR test aimed at detecting viral RNA in respiratory samples is the current standard for the confirmation of acute SARS-CoV-2 infection (World Health Organization, 2020). RT PCR has a reported sensitivity of 0.68 (probability interval 0.63, 0.73), and specificity of 0.99 (probability interval 0.98, 1.00)(Kostoulas et al., 2021). False negatives may result from poor quality of specimen, specimen taken late in the course of the disease, inappropriate handling of specimen, and technical reasons such as PCR inhibition or viral mutation (World Health Organization, 2020).

The classification of disease activity was made upon admission as follows: (1) *Asymptomatic* – absence of COVID-19 symptoms and of evidence of pneumonia, (2) *Mild* – presence of COVID-19 symptoms but without evidence of pneumonia, (3) *Moderate* **-** presence of COVID-19 symptoms and co-morbidities such as hypertension, cardiovascular disease, diabetes mellitus, chronic obstructive pulmonary disease (COPD), asthma, immunocompromising condition such as human immunodeficiency virus infection, chronic steroid use, and active malignancy; or with pneumonia but without need for oxygen support, (4) *Severe* - presence of pneumonia, oxygen saturation ≤92% on room air and requiring oxygen support, and (5) *Critical* - COVID-19 infection with findings of acute respiratory distress syndrome (ARDS), septic shock, on mechanical ventilation, or admitted in the ICU (Philippine Society for Microbiology and Infectious Diseases et al., 2020).

In-hospital mortality was defined as death during hospitalization regardless of cause. Mortality rate is the number of deaths divided by the total number of cases.

Data Collection

A group of physicians extracted the data from medical records using a standard electronic data collection form. Chest x-ray images were reviewed by three radiologists in the study team. Missing data, inconsistencies, and data accuracy were reviewed. Conflicting data were resolved by consensus.

We collected demographics, co-morbid illnesses, reasons for admission of asymptomatic patients, symptoms on presentation, vital signs on admission, illness severity on admission, and results of diagnostic studies. Outcomes such as length of hospital stay, and mortality were recorded.

Data Analysis

We used counts and percentages to summarize categorical variables. Shapiro-Wilk Test was used to assess normality of continuous variables, and data expressed as medians and interquartile range (IQR), as appropriate. Univariate analysis, with Cochran-Armitage test for trend for categorical variables, and the Jonckheere-Terpstra trend test for continuous variables were performed to compare parameters across the spectrum of disease activity. Post-hoc test (Conover) was performed for pairwise comparison of groups. We compared the duration of hospitalization across disease activity, and after revision of the discharge criteria. Kaplan-Meier analysis with log-rank test was performed to compare 28-day mortality across the spectrum of disease activity.

All tests were two-tailed, with p value less than 0.05 considered statistically significant. Analyses were conducted using Microsoft Excel and MedCalc® Statistical Software version 19.7.4.

RESULTS

Clinical Characteristics

Of the 1500 patients in the cohort, 53.0% were female (n=795), and 66.7% were less than 60 years old (n=1001). Median age was 51 years (IQR 34, 63), with a bimodal age distribution as shown in Figure 2. More than half had co-morbid conditions (n=961, 64.1%), with hypertension being the most common (n=628, 41.9%). About 20.3% (n= 305) were HCWs, while 12.3% (n=185) were pregnant. The demographic and clinical profile of the study cohort is shown in Table 1.

Of the study cohort, 81.0% (n=1,215) were symptomatic while 19.0% (n=285) did not present with any symptoms suggestive of COVID-19. Of the latter, 215 (75.4%) were found to be COVID-19 positive on routine screening. Reasons for admission included obstetric management (n=162), surgery or procedure (n=17), cancer evaluation or chemotherapy (n=15), trauma (n=11), and other medical conditions (n=10). The remaining 70 patients were tested for SARS-CoV-2 as part of contact tracing (n=28), hospital surveillance (n=24), travel requirement (n=8), pre-employment (n=6), or for hemodialysis (n=4). However, 63 of the 285 (22.1%) patients who did not have COVID-19 symptoms were found to have subclinical disease with pneumonia on chest xray (n=61), or hypoxemia requiring oxygen support (n=2). As a result, only 14.8% (n=222) were assessed to be asymptomatic, while 13.5% (n=203), 36.6% (n=549), 12.3% (n=185), and 22.7% (n=341) had mild, moderate, severe, and critical COVID-19 infection, respectively.

Severity of illness increased progressively with age (Table 1). Males, smokers, alcohol beverage drinkers, patients with comorbidities including diabetes mellitus, hypertension, heart disease, chronic kidney disease, COPD, active pulmonary tuberculosis, cancer, and preexisting neurologic disease tended to have more severe disease. Table 2 shows that majority of HCWs and pregnant women had asymptomatic and mild disease. Furthermore, most of them were less than 60 years of age and without comorbidities.

Commonly reported symptoms were cough (50.1%), fever (46.9%) and shortness of breath (37.2%). The frequency of fever, cough, shortness of breath, malaise, nausea or vomiting, decreased appetite, diarrhea, abdominal pain or discomfort, and decreased sensorium increased with greater illness severity (Table 3; Supplementary Table 1 for comprehensive list of symptoms). Abnormal vital signs on admission were observed among those with severe and critical COVID-19, with higher respiratory rates, lower peripheral oxygen saturations, and lower Glasgow coma scale scores (Table 3).

All asymptomatic patients had at least one laboratory test done, while patients with severe or critical disease had extensive diagnostic evaluation (Supplementary Table 2). Abnormal laboratory results were observed with increasing illness severity (Table 3, see Supplementary Table 3 for the limits of normal hematologic and blood chemistries for adults). Majority (n=1424, 94.9%) of patients had chest x-ray taken. More severe and critical patients had ground glass opacities, consolidation, and infiltrates affecting more than 50% of the lungs. Pleural effusion (6.7%) and pneumothorax (0.3%) were uncommon (See Supplementary Table 1 for detailed radiographic findings).

Pairwise analysis did not show statistically significant differences between mild and asymptomatic patients in terms of age, vital signs on admission, and multiple laboratory parameters (Supplementary Table 4).

Outcomes

Overall mortality rate was 15.1% (n=226). Greater illness severity was associated with mortality (Table 3) as shown in the Kaplan-Meier survival curve (Figure 3). One asymptomatic patient died of nosocomial pneumonia after developing profound neutropenia post-chemotherapy for acute leukemia.

Overall median length of hospitalization was 12 days (IQR 7, 19), and was shorter for mild cases (Table 3). Change in the discharge guidelines resulted in a statistically significant reduction ($p<0.05$) in the overall duration of hospitalization from a median of 13 days (IQR 7, 21) to 9 days (IQR 5, 14). This was also observed across all patient groups.

DISCUSSION

Our study validates published findings that have reported the following: 1) the association between COVID-19, age, and co-morbidities (Abad et al., 2021; Jin et al., 2020; Mishra et al., 2020; Salamat et al., 2021; Salva et al., 2020); 2) the common clinical presentations including cough, fever, and shortness of breath (Abad et al., 2021; Cao et al., 2020; Jin et al., 2020; Jutzeler et al., 2020; Salamat et al., 2021; Salva et al., 2020; Wong et al., 2020); and 3) an overall mortality rate of 15% (Abad et al., 2021; Salva et al., 2020). In addition, however, we highlight other important insights on COVID-19 – first, asymptomatic disease occurs frequently (14.8%) and is captured on routine evaluation; second, we observed a bimodal age distribution of COVID-19; third, HCWs are at high risk of COVID-19; and finally, symptom-based strategy considerably shortened the duration of hospitalization.

COVID-19 in the Philippines has been reported to disproportionately affect older age groups.(Haw et al., 2020) However, our findings showed a bimodal distribution of cases (Figure 2). These represent two distinct populations - the first comprising the young, economically productive sector, and the second the older population. Studies have consistently shown old age as a significant risk factor for infection, hospitalization, and adverse outcomes,(Garibaldi et al., 2021; Wu et al., 2020; Zhou et al., 2020) presumably due to immunosenescence and increased prevalence of comorbidities (Bajaj et al., 2021; Chen et al., 2021; Perrotta et al., 2020). In the United States, hospitalization is almost double for patients aged 65-74 compared to those aged 50-64 and five times compared to ages 18-49.(CDC COVID-19 Response Team et al., 2020; Garg et al., 2020) Quarantine restrictions in Metro Manila precludes the elderly from leaving the household, mitigating their risk of acquiring COVID-19. However, if members of the same household frequently come and go, this may explain disease transmission and subsequent infection of the elderly. A meta-analysis reported an estimated household secondary attack rate from both asymptomatic (0.7%; 95% CI, 0% to 4.9%), and symptomatic individuals (18.0%; 95% CI, 14.2% to 22.1%).(Madewell et al., 2020) We hypothesize that the bimodal distribution may be indirect evidence of transmission of COVID-19 infection within households, where asymptomatic young adults drive community transmission, and secondarily infect the elderly in the household.

Our findings also reflect global trends of increasing infection among the younger economically productive age groups.(Salvatore et al., 2020) This can be attributed to higher exposure related to the resumption of activities in schools and workplaces, noncompliance with restrictions, and/or the presence of comorbidities.(Czeisler et al., 2020; Salvatore et al., 2020). Since HCWs and pregnant patients comprise almost a quarter of study population (Table 2), data is also skewed leading to a younger cohort of patients.

It is possible that many infections among the HCWs in our study were detected because of better access to the test, lower threshold for SARS-CoV-2 testing, and implementation of hospital-wide surveillance for COVID-19. Nonetheless, studies have documented a higher risk of COVID-19 infection among HCWs with a reported prevalence of 11% (95% CI: 7,15)(Gómez-Ochoa et al., 2021). Poor hand hygiene, inadequate access and utilization of personal protective equipment (PPE), and exposure to aerosol-generating procedures have been identified risk factors for COVID-19 infection in the healthcare setting (El- Boghdadly et al., 2020; Ran et al., 2020; Wang et al., 2020). HCWs comprised 20.3% of our cohort. We were unable to determine whether the infection resulted from nosocomial or community-acquired transmission. But genomic studies suggest that community-acquired COVID-19 infection introduced to the healthcare setting is a more common occurrence than hospital-acquired infection(Sikkema et al., 2020). Further studies on this aspect are recommended given its infection control implications.

On the other hand, the high detection rate of COVID-19 among pregnant patients may be related to frequent prenatal checkups and the universal testing for SARS-CoV-2 in our institution. COVID-19 infection is a concern among pregnant women given the higher risk for postpartum complications including hemorrhage, admission to the ICU, and intrauterine fetal demise(Hcini et al., 2021). Feto-maternal complications from COVID-19 infection are beyond the scope of this study, and we also recommend further studies on this subgroup of patients.

Fifteen percent of our cohort had asymptomatic COVID-19. Despite the absence of symptoms, many still had laboratory tests performed. Not surprisingly, majority of these blood tests were within normal limits. From a cost-effectiveness standpoint, especially in resource-limited settings, laboratory work-up for these patients is likely unnecessary and should be done only on a case-to-case basis. On the other hand, chest imaging may be warranted as some individuals thought to be asymptomatic were reclassified after radiologic assessment. But as per national recommendation, asymptomatic and mild COVID-19 cases can be monitored in designated community care and quarantine facilities to ensure that patients with more severe disease will have access to hospital services (Philippine Society for Microbiology and Infectious Diseases et al., 2020).

National and hospital policies changed periodically during the period covered in our study in response to the evolving pandemic. The implementation of universal testing for COVID-19 in UP-PGH has been critical in identifying patients with subclinical COVID-19 disease. Early identification of these patients has important clinical implications in terms of preventing nosocomial transmission through isolation of infected patients and monitoring of disease progression to initiate timely therapeutic interventions. Several hospitals have also implemented universal testing with positivity rates ranging from 0.03% to 4.5%.(Nakamura and Itoi, 2021; Saidel-Odes et al., 2021; Sastry et al., 2020). Positivity rates were influenced by local prevalence and the level of community transmission. Data on the cost-effectiveness of universal screening is limited. But in an area where the prevalence and level of community transmission is high, i.e. ≥100 total new cases per 100,000 persons in the past 7 days, or ≥10% positive nucleic acid amplification tests during the past 3 days (Centers for Disease Control and Prevention, 2021), this may be an acceptable strategy to guide bed allocation and use of PPE, and to prevent unnecessary quarantine of exposed HCWs and nosocomial transmission.

Changes in the local guidelines significantly affected the duration of hospitalization of COVID-19 patients in our institution. The implementation of a symptom-based strategy resulted in a shorter duration of hospitalization, especially for patients with mild disease. A US study showed similar result with excess acute care length of stay as well as extra cost for test-based versus symptom-based isolation strategies (Wu et al., 2021). Studies have shown that RT-PCR positivity for SARS-CoV-2 may persist beyond infectivity, and that viable SARS-CoV-2 was not isolated among patients beyond the 8th day of symptom onset.(Bullard et al., 2020; Xiao et al., 2020) The shorter length of stay had several good consequences, including allocation of badly needed beds, and decreased cost for those who were admitted. However, the need to reallocate hospital beds must be balanced with the possibility of disease transmission from individuals recovering from COVID-19. Clinical data for those with severe or critical disease or those with immune-compromising conditions are limited, and viral shedding can theoretically be longer. As such, isolation was extended to 21 days for this sub-population of patients (Philippine Society for Microbiology and Infectious Diseases et al., 2020). As we learn more about the mechanics of transmission of the variants of concern, guidance regarding symptom-based isolation protocols may also evolve.

Implications for Clinical Practice

The economic impact and healthcare burden of COVID-19 necessitates evidence-based changes in policies to mitigate these problems. Our findings show that (1) blood tests among asymptomatic and mild COVID-19 patients are likely unnecessary; (2) universal testing in areas with high level of community transmission can guide resource- and bed allocation; and (3) a symptom-based isolation protocol can address issues of limited bed capacity.

Study Limitations

Our study has limitations inherent to its retrospective nature, including the possibility of information and misclassification bias. However, any information bias from missing data was mitigated with the use of a hospital clinical pathway for COVID-19 patients which guided systematic recording of clinical information. Misclassification bias could have resulted if patients who were asymptomatic had pneumonia on chest xray, e.g. 30% of asymptomatic patients did not have imaging, and may have been misclassified as asymptomatic rather than moderate, underestimating the proportion of patients with moderate disease. We also utilized the national guidelines for the classification of COVID-19 severity, but these are comparable with international definitions. We were unable to identify presymptomatic patients since we did not follow-up asymptomatic patients to assess if they developed symptoms within 14 days from a positive SARS-CoV-2 test result. In addition, we were unable to perform genomic analysis which could have helped evaluate transmission dynamics. Our findings may not be generalizable due to differences in population with more HCWs and pregnant patients, differences in hospital policies, clinical practice, level of community transmission. Despite these limitations, however our study has several strengths –we included a large cohort of consecutive patients, counting a good proportion of patients with asymptomatic illness who are often excluded from analysis of hospitalized patients. We were also able to discuss changes in hospital policy over the study period which impacted infection control strategies and patient outcomes.

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CONCLUSION

The clinical profile of COVID-19 patients in our study is consistent with published reports globally. Patients with asymptomatic and mild illness share similar clinical features, while markers of inflammation increase and signs of organ dysfunction become more evident with severe and critical disease. Asymptomatic COVID-19 is common, and blood tests are likely unnecessary. Universal testing may be a valuable strategy in areas of high community transmission, given its infection control implications. Overall mortality rate of COVID-19 is high at 15.1%. Symptom-based strategy shortens length of hospitalization and should be recommended.

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ACKNOWLEDGMENT

We are grateful to Dr. Kenneth Wilson O. Lim, Dr. Cecileen Anne M. Tuazon, Dr. Paula Victoria Catherine Y. Cheng, Dr. Henry Winston C. Li, Dr. Lester Jan A. Olimba, Dr. Jamela Lynn O. Compuesto, Dr. Kenzle Denise G. Monsanto, and Ms. Lozell D. Villadore for their assistance in the data collection. We express our deepest gratitude to the UP-PGH Division of Infectious Diseases, especially Dr. Jodor A. Lim, Dr. Regina P. Berba, Dr. Christine Peñalosa-Ramos, Dr. Karla Kristel A. Bañares, Dr. Samantha S. Bartolo, Dr. Bernard A. Demot, Dr. Honey Jane B. Limos, Dr. Marlon S. Arcegono, Dr. Susana V. Buno, Dr. Christina C. Tan, Dr. Mary Grace C. Astudillo, Dr. Emmeline B. Borillo, Dr. Cherry Pinky M. Budao, Dr. Mark John F. Festin, Dr. Mark Ramon Victor B. Llanes, Dr. Joe Rich P. Macrohon, and Dr. Ma. Patricia G. Virata for assisting in the retrieval of data, and for providing the resources and support needed to complete the study. Special thanks to UP-PGH and the Department of Medicine for their support for COVID-19-related research.

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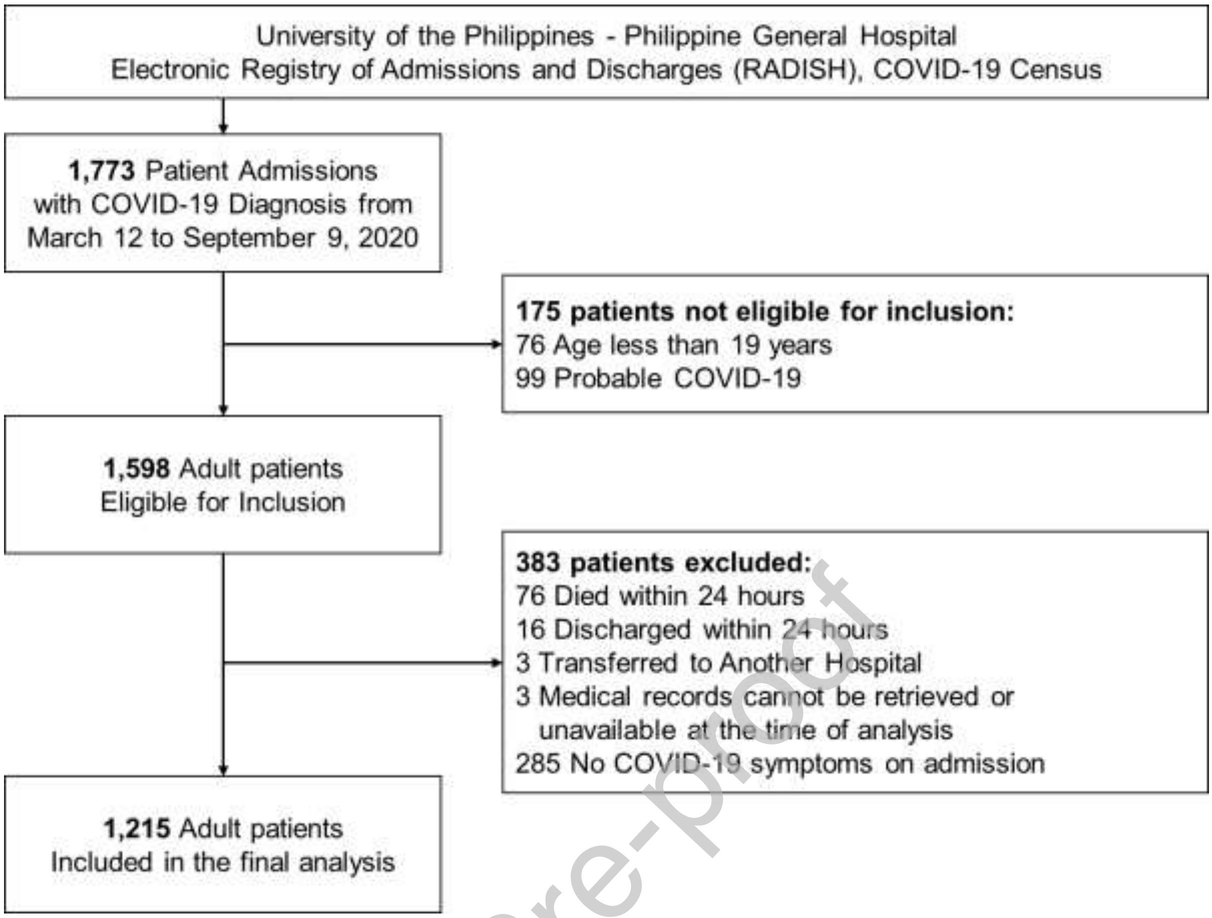

Figure 1. Flow chart of patient selection process

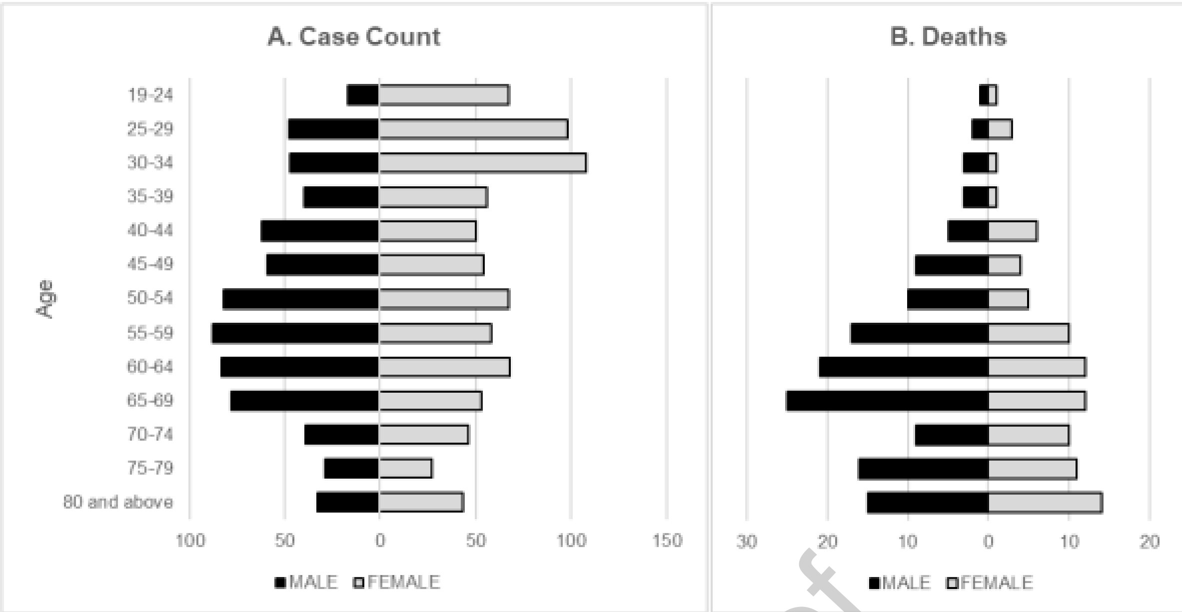

Figure 2. Age and sex distribution of 1500 patients with confirmed COVID19 admitted in UP-PGH. A. Case Count. B. Deaths. Shaded area: Black – males, Gray - females

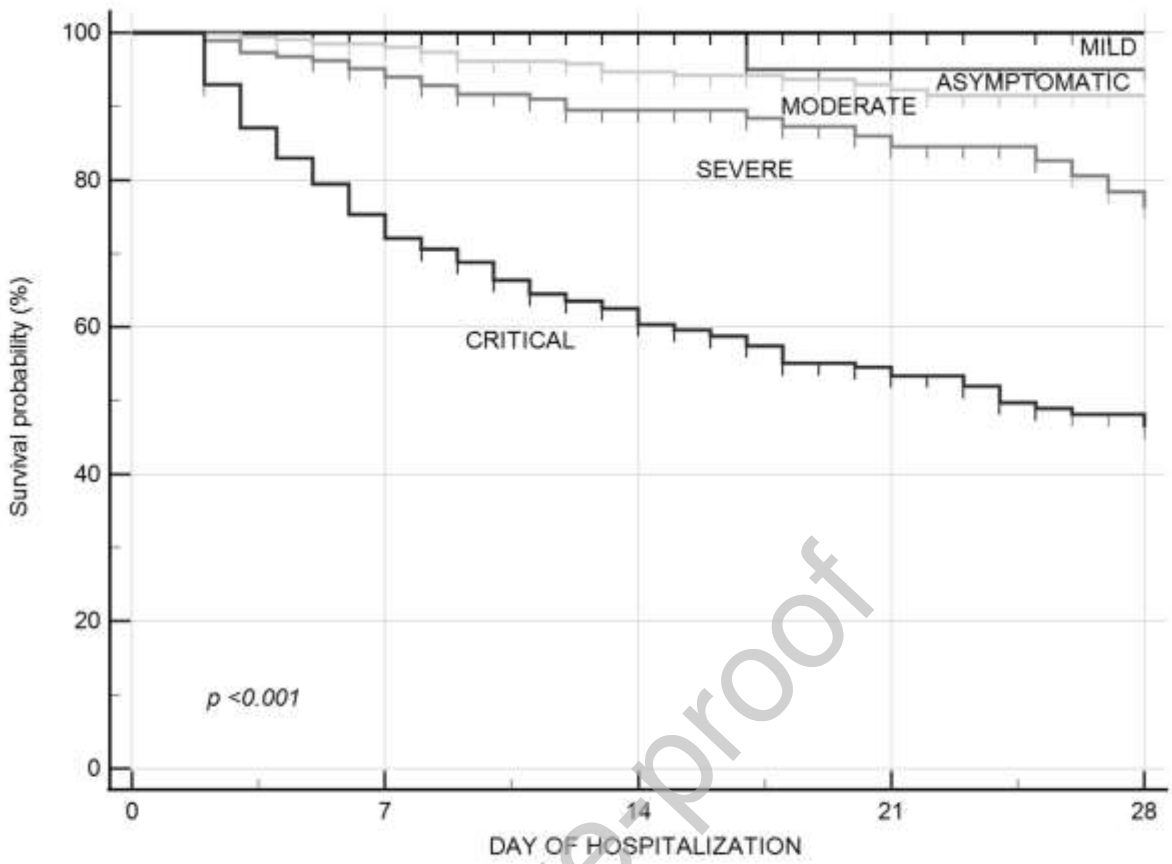

Figure 3. Kaplan -Meier Survival Curve with log-rank test of 28-day mortality among the 1,500 patients with confirmed COVID-19 disease admitted in UP-PGH, based on disease activity. The corresponding disease activity is indicated below the curve / line.

Table 1. Demographic and clinical profile of inpatients with confirmed COVID-19 infection stratified based on spectrum of disease activity

	Asymptomatic (N=222)	**Mild** (N=203)	**Moderate** (N=549)	**Severe** (N=185)	**Critical** (N=341)	**P value**
AGE						
Median (IQR)	33 (27 to 38)	31 (28 to 42)	54 (43 to 64)	57 (46 to 67)	63 (53 to 71)	<0.001
Less than 60 years, No. (%)	208 (93.7)	203 (100)	343 (62.5)	104 (56.2)	143 (41.9)	
60 years and above, No. (%)	14 (6.3)	0 (0)	206 (37.5)	81 (43.8)	198 (58.1)	<0.001
SEX, No. (%)						
Male	45 (20.3)	79 (38.9)	267 (48.6)	104 (56.2)	210 (61.6)	
Female	177 (79.7)	124 (61.1)	282 (51.4)	81 (43.8)	131 (38.4)	<0.001
COEXISTING CONDITION, No. (%)						
Any comorbid illness	55 (24.8)	54 (26.6)	433 (78.9)	141 (76.2)	278 (81.5)	<0.001
Diabetes mellitus	10 (4.5)	0 (0)	158 (28.8)	59 (31.9)	102 (29.9)	<0.001
Hypertension	29 (13.1)	0 (0)	304 (55.4)	96 (51.9)	199 (58.4)	<0.001

Heart disease	1 (0.5)	0 (0)	84 (15.3)	30 (16.2)	55 (16.1)	<0.001
Chronic liver disease	1 (0.5)	1 (0.5)	5 (0.9)	0 (0)	5 (1.5)	0.249
Chronic kidney disease	2 (0.9)	2 (1.0)	57 (10.4)	29 (15.7)	24 (7.0)	<0.001
COPD	0 (0)	0 (0)	10 (1.8)	6 (3.2)	13 (3.8)	<0.001
Asthma	3 (1.4)	24 (11.8)	36 (6.6)	12 (6.5)	16 (4.7)	0.957
Active PTB	0 (0)	1 (0.5)	15 (2.7)	10 (5.4)	14 (4.1)	<0.001
HIV	1 (0.5)	0 (0)	7 (1.3)	0 (0)	0 (0)	0.394
Cancer	12 (5.4)	0 (0)	39 (7.1)	9 (4.9)	28 (8.2)	0.019
Neurologic disease	2 (0.9)	1 (0.5)	30 (5.5)	17 (9.2)	39 (11.4)	<0.001
Smoker	14 (6.3)	19 (9.4)	107 (19.5)	39 (21.1)	98 (28.7)	<0.001
Alcohol Beverage Drinker	19 (8.6)	40 (19.7)	111 (20.2)	46 (24.9)	102 (29.9)	<0.001
History of Illicit Drug Use	1 (0.5)	3 (1.5)	9 (1.6)	5 (2.7)	6 (1.8)	0.214
SPECIAL POPULATION, No. (%)						
Healthcare workers	44 (19.8)	125 (61.6)	111 (20.2)	14 (7.6)	11 (3.2)	<0.001
Pregnant	132 (59.5)	8 (3.9)	39 (7.1)	4 (2.2)	2 (0.6)	<0.001

COPD – Chronic Obstructive Pulmonary Disease; PTB – Pulmonary Tuberculosis

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COVID-19 infection in UP-PGH

	Healthcare Workers (N = 305)		**Pregnant** (N = 185)	
Age				
Median, years (IQR)	39	(29 to 51)	30	(25 to 34)
Less than 60 years, No. (%)	283	(92.8)	185	(100)
60 years and above, No. (%)	22	(7.2)	0	(0)
Sex, No. (%)				
Male	126	(41.3)	not applicable	
Concurrent Conditions, No. (%)				
Presence of Any Comorbid Illness	138	(45.2)	30	(16.2)
Smoker	25	(8.2)	6	(3.2)
Alcohol Beverage Drinker	50	(16.4)	7	(3.8)
History of Illicit Drug Use	1	(0.3)	1	(0..5)
Disease Activity, No (%)				
Asymptomatic	44	(14.4)	132	(71.4)
Mild	125	(41.0)	8	(4.3)
Moderate	111	(36.4)	39	(21.1)
Severe	14	(4.6)	4	(2.2)
Critical	11	(3.6)	2	(1.1)
Mortality				
Number (%)	3	(1.0)	1	(0.5)

Length of Hospital Stay				
Days, median (IQR)	11	(8 to 4)	3	(2 to 5)

Table 3. Clinical characteristics on admission and outcomes of patients with COVID-19 infection in UP-PGH

	DISEASE ACTIVITY ON ADMISSION					
	Asymptomatic (N=222)	**Mild** (N=203)	**Moderate** (N=549)	**Severe** (N=185)	**Critical** (N=341)	**P value**
SYMPTOMS, No. (%)						
Fever	-	97 (47.8)	269 (49.0)	108 (58.4)	229 (67.2)	<0.001
Cough	-	91 (44.8)	285 (51.9)	132 (71.4)	244 (71.6)	<0.001
Shortness of Breath	-	40 (19.7)	145 (26.4)	130 (70.3)	243 (71.3)	<0.001
Malaise / Fatigue / Generalized Weakness	-	50 (24.6)	132 (24.0)	58 (31.4)	105 (30.8)	<0.001
Diarrhea	-	44 (21.7)	76 (13.8)	27 (14.6)	52 (15.2)	<0.001
Nausea or Vomiting	-	7 (3.4)	23 (4.2)	14 (7.6)	21 (6.2)	<0.001
Decreased Appetite	-	9 (4.4)	44 (8.0)	33 (17.8)	75 (22.0)	<0.001
Abdominal pain / discomfort	-	9 (4.4)	26 (4.7)	9 (4.9)	14 (4.1)	0.048
Change or Loss in Taste	-	17 (8.4)	39 (7.1)	14 (7.6)	24 (7.0)	0.012
Decreased Sensorium	-	5 (2.5)	23 (4.2)	7 (3.8)	53 (15.5)	<0.001

VITAL SIGNS, median (IQR)						
Systolic blood pressure, mmHg	120 (110 -130)	120 (110 - 130)	130 (120 - 140)	130 (120 - 144)	130 (113 - 145)	<0.001
Diastolic blood pressure, mmHg	80 (70 - 80)	78 (70 - 80)	80 (70 - 86)	80 (70 - 85)	80 (70 - 85)	0.069
Heart rate, beats/min	85 (78 - 92)	83 (76 - 91)	84 (78 - 92)	90 (80 - 102)	98 85 - 112)	<0.001
Respiratory rate, breaths/min	20 (19 - 20)	20 (18 - 20)	20 (20 - 20)	22 (20 - 24)	26 (23 - 30)	<0.001
Temperature, ^{o}C	36.6 (36.4 - 36.9)	36.5 (36.1-36.8)	36.6 (36.2-37.0)	36.7 (36.5-37.3)	36.7 (36.3-37.0)	<0.001
Peripheral O_2 saturation, %	98 (97 - 99)	98 (97 - 99)	98 (96 - 98)	95 (91 - 97)	92 (81 - 96)	<0.001
Glasgow Coma Scale score	15 (15 - 15)	15 (15 - 15)	15 (15 - 15)	15 (15 - 15)	15 (15 - 15)	<0.001
LABORATORY FINDINGS						
Complete Blood Count, median (IQR)						
Hemoglobin, g/L	127 (117 - 137)	140 (132 - 149)	130 (114 - 143)	124 (105 - 138)	128 (110 - 143)	<0.001
White blood cells, x10^9/L	10.3 (8.0 - 12.7)	7.1 (5.2 - 8.9)	7.2 (5.5 - 9.4)	7.8 (5.8 - 10.3)	10.6 (7.4 - 14.9)	<0.001
Neutrophil, %	70.0 (63.3 - 77.0)	59.0(51.0-66.0)	65.0 (56.0-74.0)	76.0(69.0-83.0)	84.0(76.0-89.0)	<0.001
ALC, x10^9/L	1.97 (1.57 - 2.48)	1.96(1.56-2.44)	1.53(1.09-2.06)	1.00 (0.80-1.35)	0.91(0.58-1.39)	<0.001
Platelet, x10^9/L	284 (237 - 347)	293 (238-336)	271 (202-364)	270 (181-385)	267 (203-343)	0.009

Arterial blood gas, median (IQR)						
pO_2 and FiO_2 ratio	467 (424 - 511)	467 (429 - 519)	410 (360 - 462)	338 (281 - 425)	175 (108 - 262)	<0.001
Blood Chemistry, median (IQR)						
Serum creatinine, µmol/L	56.0 (46.0 - 74.5)	61.5(52.0-76.5)	70.0(54.0-97.0)	80.0(60.0-127.3)	93.0(69.0-165.5)	<0.001
Alanine aminotransferase, IU/L	18.0 (12.0 - 34.0)	30.0(17.0-54.5)	31.5(21.0-67.0)	45.0(21.0-80.0)	46.0(26.0-79.3)	<0.001
Albumin, g/L	39.0 (35.8 - 44.0)	45.0(41.0-47.0)	38.0(34.0-43.0)	35.0(32.0-38.0)	34.0(30.0-38.0)	<0.001
Total bilirubin, mg/dl	0.57 (0.42 - 0.87)	0.55(0.44-0.77)	0.63(0.49-0.89)	0.76(0.49-0.99)	0.86(0.58-1.20)	<0.001
Inflammatory Markers, median (IQR)						
Lactate dehydrogenase, U/L	233 (203 - 279)	220 (187-253)	281 (230-353)	374 (307-487)	541 (390-748)	<0.001
Serum ferritin, ng/mL	89 (38 - 229)	126 (56-330)	407 (196-806)	1000(460-1950)	1280(704-2280)	<0.001
Serum procalcitonin, ng/mL	0.07 (0.04 - 0.11)	0.04(0.04-0.05)	0.07(0.04-0.28)	0.24(0.09-1.04)	0.47(0.17-1.65)	<0.001
D-dimer, ug/mL	0.62 (0.32 - 1.42)	0.40(0.30-0.74)	0.82(0.42-1.86)	1.68(0.87-3.23)	2.74(1.44-7.52)	<0.001
C-reactive protein, No. (%)						
No CRP test done	129 (58.1)	31 (15.3)	109 (19.9)	23 (12.4)	30 (8.8)	
≤12 mg/L	84 (37.8)	143 (70.4)	221 (40.3)	25 (13.5)	24 (7.0)	
>12 mg/L	9 (4.1)	29 (14.3)	219 (39.9)	137 (74.1)	287 (84.2)	<0.001

CHEST RADIOGRAPH, No. (%)						
No chest x-ray[a]	69 (31.1)	3 (1.5)	2 (0.4)	1 (0.5)	1 (0.3)	
Pulmonary Infiltrates						
Bilateral	0 (0)	0 (0)	261 (47.5)	160 (86.5)	306 (89.7)	<0.001
More than 50% of the lungs	0 (0)	0 (0)	109 (19.9)	129 (69.7)	261 (76.5)	<0.001
Limited - periphery	0 (0)	0 (0)	52 (9.5)	16 (8.6)	17 (5.0)	0.011
Density						
Ground glass[b]	0 (0)	0 (0)	244 (44.4)	134 (72.4)	269 (78.9)	<0.001
Consolidation	0 (0)	0 (0)	13 (2.4)	22 (11.9)	68 (19.9)	<0.001
MORTALITY						
Number (%)	1 (0.5)	0 (0)	34 (6.2)	29 (15.7)	162 (47.5)	<0.001
LENGTH OF HOSPITAL STAY						
Days, Median (IQR)	4 (3 - 9)	11 (7 - 14)	12 (8 - 20)	15 (10 - 24)	14 (7 - 21)	<0.001
Before change in guidelines	7 (4 - 12)	12 (7 - 17)	13 (9 - 23)	16 (11 - 26)	14 (6 - 24)	<0.001
After change in guidelines	3 (2 - 4)	9 (6 - 11)	9 (6 - 13)	11 (9 - 19)	13 (7 - 19)	<0.001

a. Patients who did not have chest radiographs available for review: missing chest xray plate, chest xray not done on admission, or no chest xray done

b. Ground glass opacity in chest radiographs was defined as haziness of the lung parenchyma with preservation of the bronchovascular margins (Hansell et al., 2008)

Cochran-Armitage test for trend for categorical variables, and the Jonckheere-Terpstra trend test for continuous variables

ALC – Absolute Lymphocyte Count